

**REMARKS**

Claims 1-7 were pending in the present application and were rejected. Claims 1 and 3-7 are herein amended. Claim 2 is cancelled herein. New claims 8-14 are added herein.

**Applicant's Response to Claim Rejections under 35 U.S.C. §102**

**Claims 1-6 were rejected under 35 U.S.C. §102(b) as being anticipated by Shuber (U.S. Patent No. 5,589,330).**

It is the position of the Office Action that Shuber discloses the invention as claimed. Shuber is directed at a high-throughput screening method for sequence or genetic alterations in nucleic acids using elution and sequencing of complimentary oligonucleotides. Shuber describes at column 5, lines 1-12 a hybridization reaction in a hybridization mixture having "appropriate concentrations of one or more agents that eliminate the disparity in melting temperatures" among oligonucleotides of identical length but different guanosine/cytosine compositions. Shuber gives tetramethylammonium chloride (TMAC) as an example of such an agent.

The Office Action alleges that TMAC includes an ammonium cation and a halide (Cl<sup>-</sup>) ion when TMAC is dissolved in an aqueous solution. However, Applicants respectfully submit that this is inaccurate. Shuber discloses an RNA solution prepared by dissolving RNA with an aqueous solution of TMAC. TMAC is not an ionic liquid, but rather is a solid type quaternary ammonium salt having a melting point of 420°C. See [www.ChemExper.com](http://www.ChemExper.com), RN: 75-57-0.

However, in order to expedite examination, Applicants herein amend claim 1 in order to more specifically recite the anion and cation of the ionic liquid. This amendment is supported by

the specification at page 8, lines 26-29. Note that amended claim 1 does not recite that the cation can be an ammonium cation. Accordingly, Applicants respectfully submit that claim 1 distinguishes over Shuber.

With respect to claim 4, the Office Action states that “the pH of the hybridization buffer is approximately 6.8,” and thus concludes that the ionic liquid is neutralized. However, Applicants respectfully submit that the specification defines a “neutralized ionic liquid” as one which is composed of a salt obtainable by an acid-base neutralization reaction. TMAC is not such a neutralized ionic liquid. Rather, TMAC is a quaternary ammonium salt. Therefore, for at least the above reasons, Applicants respectfully submit that the pending claims are patentable over Shuber. Favorable reconsideration is respectfully requested.

**Claims 1-6 were rejected under 35 U.S.C. §102(b) as being anticipated by Ohno et al. (J. of The Electrochemical Society (2001)).**

It is the position of the Office Action that Ohno discloses the invention as claimed. Ohno is co-authored by one of the inventors, and is directed at ion conductive characteristics of DNA film containing ionic liquids. Ohno discloses the mixing of ethylimidazolium tetrafluoroborate (EtImBF<sub>4</sub>) with DNA to obtain a flexible film. As illustrated at the top of the first column on page E169, EtImBF<sub>4</sub> appears to contain an imidazolium cation and a BF<sub>4</sub><sup>-</sup> anion.

Ohno discloses a DNA film formed from a composition comprising EtImBF<sub>4</sub>, DNA and water. Being that the DNA forms a film, it exists only in a solid state in the film. In other words, the DNA is not dissolved in EtImBF<sub>4</sub>. Rather, EtImBF<sub>4</sub> is only mixed in the DNA film in the

liquid state. Thus, Applicants respectfully submit that Ohno does not disclose or suggest the solvent of claim 1.

Additionally, Applicants herein add claim 10, which recites a smaller Markush group of anions. EtIMBF<sub>4</sub>, it does not disclose an anion as recited by new claim 10. It is noted that BF<sub>4</sub><sup>-</sup> is not included in new claim 10. Accordingly, Applicants respectfully submit that Ohno does not disclose or suggest the embodiment as recited by new claim 10.

Finally, Applicants respectfully submit that pending claims 3-6 are patentable due to their dependency on claims 1 and 10. Favorable reconsideration is respectfully requested.

**Applicants' Response to Claim Rejections under 35 U.S.C. §§102, 103**

**Claim 7 was rejected under 35 U.S.C. §102(b) as anticipated by, or in the alternative, under 35 U.S.C. §103(a) as being unpatentable over, Shuber or Ohno.**

It is the position of the Office Action that Shuber and Ohno do not explicitly teach that the nucleic acid dissolve in their recited liquids are "preserved." However, the Office Action regards this limitation as inherent. With respect to Shuber, the Office Action states that if the nucleic acids were not preserved (i.e., they were degraded), no hybridization signal would have been detected. Similarly, with respect to Ohno, the Office Action states that if the nucleic acids were not preserved (i.e., they were degraded), a signal similar to that of ionic liquid alone would have been seen, referring to Figure 2.

As discussed above, neither Shuber nor Ohno teaches a solvent for dissolving nucleic acids. Accordingly, Shuber and Ohno, either singly or in combination, fail to teach a method for preserving nucleic acids in an ionic liquid.

Additionally, Applicants herein amend the claims in order to more specifically define what is meant by "preserving." For example, Applicants herein amend claim 7 to recite "long-term" preservation. This is supported at least by page 10, lines 3-8. Furthermore, Applicants herein add new claims 8 and 9, which recite specific preservation durations. These amendments and claims are supported at least by page 18, lines 13-17 and 29-31. Thus, Applicants respectfully submit that neither Shuber nor Ohno discloses or suggests any such long-term preservation. Favorable reconsideration is respectfully requested.

#### **New Claims**

Additionally, Applicants herein add new claims 11-14 directed at a method of dissolving nucleic acids. Applicants respectfully submit that these claims are patentable over the cited art. Favorable consideration is respectfully requested.

For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

Should the Examiner deem that any further action by applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicants' undersigned attorney.


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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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